This listing of claims will replace all prior versions and listings of claims in the application:

## Listing of Claims:

1. (Cancelled)

2. (Previously presented) A sealable crucible for growing a III-nitride semiconductor crystal, said crucible comprising an elongated wall structure extending in a longitudinal direction, said wall structure comprising a plurality of grains and defining an interior crystal growth cavity, said wall structure having a thickness dimension (i) extending in a direction substantially perpendicular to said longitudinal direction and (ii) being at least about 1.5 times the average grain size.

3. (Cancelled)

4. (Previously presented) The crucible of claim 2 being sized and shaped for growing an aluminum nitride single crystal using a sublimation-recondensation technique.

5. (Previously presented) The crucible of claim 2 wherein said plurality of grains
   (i) form at least first and second layers, said first layer including a portion of the plurality of grains forming an inside surface of said wall structure and said second layer being adjacent said first layer; and
   (ii) define a plurality of diffusion pathways within said structure, said grains swelling upon absorption of either nitrogen or the column III atoms of said III-nitride, thereby substantially obstructing at least some of the diffusion pathways.

6. (Previously presented) The crucible of claim 5 wherein the diffusion pathways defined by boundaries between adjacent grains are substantially obstructed by others of said grains when they swell upon said absorption.

7-8. (Cancelled)

9. (Original) The crucible of claim 2 wherein said cavity includes a substantially cylindrical portion and a tapered conical end portion.

10. (Original) The crucible of claim 2 wherein said wall structure defines a cavity having a transverse dimension ranging from about 5 to about 50 millimeters.

11. (Original) The crucible of claim 2 wherein said wall structure defines a cavity having a transverse dimension greater than about 50 millimeters.

12. (Original) The crucible of claim 2 wherein said thickness dimension is at least about three times that of the average grain diameter.

13. (Previously presented) The crucible of claim 2 comprising a material selected from the group consisting of: tungsten-rhenium (W-Re) alloys; rhenium (Re); tantalum monocarbide (TaC); tantalum nitride ($Ta_2N$); hafnium nitride (HfN); a mixture of tungsten and tantalum (W-Ta); tungsten (W); and combinations thereof.

14-18. (Cancelled)

19. (Currently amended) A method for fabricating a crucible for use in growing aluminum nitride single crystals, said method comprising fabricating a wall structure from a granular material, the wall structure defining an interior crystal growth cavity and comprising a plurality of grains, said grains forming at least first and second layers, the first layer including a portion of the ~~pluraliry~~plurality of grains forming an inside surface of the wall structure and the second layer being superimposed on the first layer.

20. (Original) The method of claim 19, wherein the granular material is selected from the group consisting of: tungsten-rhenium (W-Re) alloys; rhenium (Re); tantalum monocarbide (TaC); tantalum nitride ($Ta_2N$); hafnium nitride (HfN); a mixture of tungsten and tantalum (W-Ta); tungsten (W); and combinations thereof.

21. (Currently amended) The method of claim 19 wherein at least a portion of the wall structure is fabricated by steps comprising:

(i) pressing the granular material into a desired shape;

(ii) sintering the granular material to form a sintered structure; and

(iii) heating the sintered structure at a temperature ranging from at [[at ]]least about 2000 °C to about 2500 °C under conditions suitable to effect grain swelling.

22. (Previously presented) The method of claim 21, wherein, in step (iii), the sintered structure is heated in an atmosphere selected from the group consisting of inert atmospheres and chemically active atmospheres.

23. (Currently amended) The method of claim 19 wherein at least a portion of the wall structure is fabricated by steps comprising:

(i) mixing TaC powder and $Ta_2C$ powder to form a mixture;

(ii) pressing the mixture into a desired shape;

(iii) sintering the mixture to form a sintered structure; and

(iv) heating the sintered structure in an atmosphere comprising one or more hydrocarbon gases at a temperature ranging from at [[at]] least about 2000 °C to about 2500 °C to convert at least a portion of $Ta_2C$ in the sintered structure to TaC.

24. (Previously presented) The method of claim 23, wherein the mixture comprises between about 10 and about 50 percent of $Ta_2C$ by volume.

25. (Previously presented) The method of claim 23, wherein step (i) further comprises adding Ta to the mixture.

26. (Currently amended) The method of claim 19 wherein at least a portion of the wall structure is fabricated by steps comprising:

(i) mixing $Ta_2N$ powder and Ta powder to form a mixture;

(ii) pressing the mixture into a desired shape;

(iii) sintering the mixture to form a sintered structure; and

(iv) heating the sintered structure in an atmosphere comprising $N_2$ gas at a temperature ranging from at [[at ]]least about 2000 °C to about 2500 °C and a pressure ranging from about 0.1 to about 10 bars to convert at least a portion of Ta in the sintered structure to $Ta_2N$.

27. (Currently amended) The method of claim 19 wherein at least a portion of the wall structure is fabricated by steps comprising:

(i) mixing HfN powder and hafnium (Hf) powder to form a mixture;

(ii) pressing the mixture into a desired shape;

(iii) sintering the mixture to form a sintered structure; and

(iv) heating the sintered structure in an atmosphere comprising $N_2$ gas at a temperature ranging from at [[at ]]least about 2000 °C to about 2500 °C and a pressure ranging from about 0.1 to about 10 bars to convert at least a portion of Hf in the sintered structure to HfN.

28. (Currently amended) The method of claim 19 wherein at least a portion of the wall structure is fabricated by steps comprising:

(i) mixing W powder and Ta powder to form a mixture;

(ii) pressing the mixture into a desired shape;

(iii) sintering the mixture to form a sintered structure; and

(iv) heating the sintered structure in an atmosphere comprising $N_2$ gas at a temperature ranging from at [[at ]]least about 2000 °C to about 2500 °C and a pressure ranging from about 0.1 to about 10 bars to convert at least a portion of Ta in the sintered structure to $Ta_2N$.

29. (Previously presented) The method of claim 28, wherein the mixture comprises between about 0.5 and about 10 atom percent of Ta.

30. (Currently amended) A method for fabricating an aluminum nitride crystal, said method comprising:

(i). depositing aluminum nitride in a crystal growth cavity of a crucible comprising an elongated wall structure defining the crystal growth cavity, the elongated wall structure ~~and~~ comprising a plurality of grains, the grains forming at least first and second layers, the first layer including grains forming an inside surface of the wall structure and the second layer being superimposed on the first layer;

(ii). sealing the crucible; and

(iii). heating at least a portion of the crucible to a temperature in excess of about 2000 °C[[.]],

wherein during step (iii), in at least the portion of the crucible, grains of at least the second layer swell to substantially obstruct diffusion of aluminum along diffusion pathways defined by boundaries between grains of at least the first layer.

31. (Cancelled) ~~The method of claim 30, further comprising enabling grains of at least the second layer to swell to substantially obstruct diffusion of aluminum along diffusion pathways defined by boundaries between grains of at least the first layer.~~

32. (Previously presented) A crucible for use in the single-crystal growth of aluminum nitride, said crucible comprising a wall structure defining an interior crystal growth cavity and comprising a plurality of grains defining a plurality of diffusion pathways within said structure, said grains swelling upon absorption of at least one of aluminum and nitrogen, thereby substantially obstructing at least some of the diffusion pathways.

33. (Previously presented) The crucible of claim 32 wherein said diffusion pathways are defined by boundaries between adjacent grains, said grains forming at least first and second layers, said first layer including grains forming an inside surface of said crucible and said second layer being superimposed on said first layer.

34. (Previously presented) The crucible of claim 33 wherein the diffusion pathways of said first layer are substantially obstructed by swollen grains of said second layer upon absorption of at least one of aluminum and nitrogen by said grains.

35. (Currently amended) An aluminum nitride single-crystal boule ~~grown in a polycrystalline crucible that comprises an elongated wall structure (i) defining a crystal growth cavity and (ii) comprising a plurality of grains, said aluminum nitride single-crystal boule having~~tapered to a diameter greater than about 20 mm.

36. (Currently amended) The aluminum nitride single-crystal boule of claim [[35]]42 wherein the wall structure comprises a material selected from the group consisting of: tungsten-rhenium (W-Re) alloys; rhenium (Re); tantalum monocarbide (TaC); tantalum nitride ($Ta_2N$); hafnium nitride (HfN); a mixture of tungsten and tantalum (W-Ta); tungsten (W); and combinations thereof.

37. (Currently amended) The aluminum nitride single-crystal boule of claim [[35]]42 wherein diffusion of aluminum through the wall structure during the crystal growth is substantially obstructed by grain swelling due to absorption of at least one of aluminum and nitrogen.

38. (Previously presented) The aluminum nitride single-crystal boule of claim 35 having a diameter greater than about 50 mm.

39. (Previously presented) The aluminum nitride single-crystal boule of claim 35 having a length greater than about 12 mm.

40. (Previously presented) The aluminum nitride single-crystal boule of claim 35 grown at a rate of about 0.3 mm per hour.

41. (Previously presented) The aluminum nitride single-crystal boule of claim 35 grown for a period of time greater than about 100 hours.

42. (New) The aluminum nitride single-crystal boule of claim 35, wherein the boule is grown in a polycrystalline crucible that comprises an elongated wall structure (i) defining a crystal growth cavity and (ii) comprising a plurality of grains.